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Portland, Oregon

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*(This report will be presented to the membership for discussion and action
on Friday, April 27, 1979)*

REPORT ON ENERGY CONSERVATION IN THE PORTLAND METROPOLITAN AREA

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**REPORT ON
ENERGY CONSERVATION
IN THE PORTLAND METROPOLITAN AREA**

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I. INTRODUCTION

Study Charge and Committee Formation

The research reported here was authorized by the City Club Board of Governors on Jan. 24, 1977. It is significant that at that time the Pacific Northwest was going through one of the worst winter droughts in this century. With little water stored in mountain snowpacks, there was widespread anticipation that sometime during late summer and the fall not enough stream runoff would be available for the region's hydroelectric system to meet its share of demand. There had been a shortage a few years earlier, and some curtailments with it — most noticeably in commercial display lighting. Heavily dependent on electric power, and accustomed to its historic abundance, Portland-area and Pacific Northwest residents once again shared the prospect of electricity shortages and the realization of how easily the supply of that resource could fail to meet demand.

Against this backdrop, the study charge acknowledged the impending crisis, cited energy conservation as a key factor in forestalling it, and authorized formation of the Energy Conservation Study Committee in order to:

1. Examine current and planned energy conservation efforts in the Portland metropolitan area,
2. Assess their adequacy, and
3. Make appropriate recommendations.

The Committee was formed in March 1977 and began its work on April 20. It proceeded from a basic understanding that energy conservation is a means by which society can 1) more efficiently use existing energy resources, 2) consume less of those resources to get the same desired result, and 3) reduce needless energy waste. Because it was charged to investigate preparations for an electric energy crisis that was felt to be on the horizon, the Committee was initially expected to complete its work by the end of the year. However, it found local energy conservation a subject which does not yield to study so readily. It is linked with regional and national energy issues. It is rooted in different ways in nearly all aspects of our local social and economic structure. It is constantly evolving. And it is seldom simple. These are factors which pushed the research beyond its initial deadline.

One other development — or nondevelopment — had a bearing on the course of the study. The expected power shortage which precipitated the study charge failed to materialize. As the third quarter of 1977 ended and as the fourth quarter unfolded, it became increasingly clear there would be no electric power supply shortage in the Pacific Northwest as feared. A number of factors — cutoff of supply to industries which buy interruptible power, voluntary curtailment by other consumers, and high fourth quarter rainfall — dissipated immediate anxieties about brownouts or blackouts.

Failure of the power shortage to occur freed the Committee to concentrate on local energy conservation as a long-term issue. By then the Committee had found that most local energy conservation proposals and activities are long-range in their aims. They are intended to address problems in the coming two decades and beyond the turn of the century. Committee members not only gravitated toward this kind of conservation as a more fruitful subject of scrutiny, they also agreed that the best solution to any threat of shortage (near or distant) lies in long-range policies and programs. The status of such policies and programs became the focus of the study.

Scope of the Study

The Committee recognized at the beginning of the study it could not possibly do a complete survey of local energy conservation activities. However, it felt it could look at a number of factors which suggest a picture of conservation progress. During the 22 months that the Committee was occupied with the study, it interviewed dozens of people with knowledgeable perspective on one or more aspects of energy conservation (listed in Appendix A). It read volumes of official reports and documents (the most pertinent of

them listed in Appendix B). In addition, it followed energy issues in both the mass news media and in trade industry and interest group journals. The Committee paid particular attention to two major, recent studies, the *Northwest Energy Policy Project*, which was sponsored by the Pacific Northwest Regional Commission, and the *Portland Energy Conservation Project*, which was sponsored by the City of Portland.

In particular, the Committee examined energy conservation policies, programs, and activities as they pertain to the following principal sectors:

1. Residential
2. Commercial
3. Industrial
4. Government

The Committee was especially interested in finding out how people and organizations within these sectors are 1) practicing energy conservation themselves, and 2) providing energy conservation leadership in the local area as a whole.

Specific Limitations to the Study

By paying more attention to some areas of energy conservation, the Committee was forced to give less attention to others. For example, it spent more of its time on energy conservation issues related to residential and commercial buildings than to manufacturing. The problems and the potential remedies in these two sectors are not only clearer, the relative potential for energy savings in each is much greater than in manufacturing. Moreover, use of residential energy involves virtually everyone and therefore serves as a barometer of our conservation values and behaviors.

The study also paid more heed to conservation of electricity than other forms of energy because electricity is a heavily-used local resource and the only energy that is regionally produced. However, the Committee did not ignore conservation efforts which have a strong bearing on consumption of natural gas and oil.

The Committee decided not to study energy conservation in transportation for two basic reasons. First, the most significant means of energy conservation in local transportation is the mass transit system, including that system's promotion of car pooling. Yet, local mass transit has already been considered at length in other City Club research. Second, with the exception of mass transit projects and enforcement of the 55-mile-per-hour highway speed limit, local leaders have very little leverage (in the way of incentives, market influence, or mandatory powers) on energy conservation in transportation. That seems to remain largely in the province of national energy policy. Federal fuel efficiency standards for automobiles is a good case in point.

The Committee also decided not to consider the role of less conventional technologies (such as solar heating) in energy conservation, first because they don't represent a significant share of consumption, and second because their applications, efficiencies, and economic feasibility are largely unsettled at this time. The Committee did not fail to recognize the importance of recycling as a means of conserving the energy used to make things. However, it decided that recycling, which might constitute an entire study of itself, should be considered only to the extent it is part of any larger conservation policy or program.

Finally, the Committee — in keeping with its study charge — restricted the geographic scope of its research to the Portland metropolitan area (basically Multnomah, Washington, and Clackamas counties in Oregon, and, to some extent, Clark County in Washington). Some policies and measures at the State of Oregon and regional levels were considered, but only as they pertained to local energy conservation.

II. BACKGROUND

In 1973, while it suffered through the OPEC¹ oil embargo with the rest of the nation, the Portland area felt another new dimension of its energy vulnerability. The 1973-74 drought served notice that the Northwest's hydroelectric system could no longer be expected to meet the region's growing appetite for electric power. Neither that drought nor the one in 1977 developed into a major supply failure. However, they both confirmed what power industry officials had publicly acknowledged since the mid 1960s about the region's power generating limitations in a low-water year.

Energy conservation has become an important local and regional issue not only because of the limited availability of hydroelectric resources, but also because of 1) the increasing worldwide depletion and cost of fossil fuels, and 2) the intense capital cost and environmental quarrel that have attended the development of thermal electric power generation. In order to better understand how the Portland area has arrived at some of its particular energy problems, it is useful to look briefly at the area's energy consumption and its history of energy use.

Consumption

According to the Portland Energy Conservation Project report of June 1977, the Portland area consumed 256 trillion BTUs of total energy in 1975. In more concrete terms, that consumption level is the rough equivalent of the energy potential in 42 million barrels of crude oil. That year, by comparison, all of Oregon consumed 455 trillion BTUs, the equivalent of 81 million barrels of oil energy.

The Committee could not determine a precise percentage breakdown of the energy resources used by Portland area consumers, but the Oregon Department of Energy breakdown for all of the state in 1974 provides some indication:

Petroleum fuel	55 percent
Electricity	19 percent
Natural gas	16 percent
Wood residue	9 percent
Coal	1 percent

The Portland area's primary use patterns are suggested by the Portland Energy Conservation Project's breakdown for 1975:

Manufacturing	39 percent
Transportation	27 percent
Residential dwellings	21 percent
Commercial buildings	10 percent
Government facilities	3 percent

Together, the paper and primary metals industries used 20 percent of the energy consumed that year in the metropolitan area.

Portland area residential use of electricity is particularly significant. In 1975, for example, 26 percent of all Portland area residence used electricity for space heating, compared to 8 percent of all residences nationwide.

Electric Energy

Local steam generation from wood and municipal waste supplied most of the Portland area's electric power needs before 1937, the year the Bonneville Project Act was signed into law. That legislation created the Bonneville Power Administration (BPA) and charged it with two key tasks: 1) to market electric energy generated at the Bonneville Dam (completed in 1938), and 2) to develop a transmission system for the delivery of that power to Pacific Northwest customers. Over the years, BPA's authority was extended in the Columbia River basin to the marketing of power from all federal hydro-

¹Organization of Petroleum Exporting Countries.

electric projects, a variety of dams built either by the Army Corps of Engineers or the Bureau of Reclamation to provide power storage and generation as well as flood control, navigation, and irrigation. Together, these dams and the BPA's transmission system comprise the Federal Columbia River Power System which today supplies about half of the region's electric energy.

In the early years after the construction of the Bonneville Dam, electricity supply was so abundant and federal dam building was so popular that BPA devoted a large amount of its attention to creating markets for the electricity it was generating. Following a congressional mandate to offer federally generated power "for the benefit of the general public, and particularly of domestic and rural customers," BPA assisted localities throughout the Northwest to form public utilities and cooperatives. Under what is now commonly called the "preference clause," the agency was charged to give these bodies priority access to wholesale federal hydropower. But because the energy was so abundant, BPA was more than anxious to sell it to investor-owned utilities and direct industrial buyers—especially the aluminum industry, which it encouraged to locate in the region.

It is useful to note that Oregon and Washington took different paths in the development of their utility systems. Historic circumstances in Washington favored public ownership. As a result, about 60 percent of that state's utilities are public. In Oregon, even before the Bonneville Project Act, private ownership of utilities was well established, especially in the Portland area. Today investor owned utilities serve 80 percent of the state and all of the Portland area. Public utility ownership did not flourish in Oregon partially because the private utility interests fought it and partially because privately marketed power was not much more expensive than publicly marketed power, at least until 1973.

During the years that BPA worked to find outlets for its electricity, the population and economy of the Northwest (Idaho, Oregon, and Washington) were growing rapidly. For example, the region grew from 4.7 million people in 1950 to 6.9 million in 1975. Residential electricity customers increased in that same period from 1.1 million to 2.3 million households. Even more significantly, the annual energy consumption per household rose from 5,112 kilowatt hours in 1950 to 15,583 kilowatt hours in 1975. That combination of increases in population and household consumption resulted in an annual average growth rate of more than 7 percent in demand for electricity during these years. Today, the region has the highest per capita use of electricity in the nation.

In the mid 1960s, power industry officials knew that this rapid growth in demand would soon outstrip the region's hydroelectrical potential. Therefore, the industry, along with BPA, began an ambitious program in 1969 to add thermal generating plants to the regional system.

In the Portland area today, there are two significant trends in electricity consumption. General demand is increasing as the population grows and creates the need for new housing — the majority of which is heated by electricity. On the other hand, residential use of electricity has declined roughly 6 percent per household since 1973 as private utility rates have nearly doubled and as people have become more aware of the need for conservation.

The Portland area is served by two investor owned utilities. Portland General Electric Company has a franchise for about 75 percent of the Portland service area and Pacific Power and Light Company has the remaining 25 percent. Until recently, both utilities purchased large amounts of BPA power for resale to Portland-area customers. However, the demands of BPA's preference-clause public utility customers and its direct service industrial buyers already under contract now require all of the agency's firm power. PGE and PP&L now can purchase only secondary energy from BPA. This change has been especially significant for PGE and its large contingent of Portland-area customers because the utility has been forced to expand from primarily a retailer of BPA power to primarily a power-producing utility which generates 60 percent of the electricity it sells.

Although the private utilities have some hydroelectric facilities of their own, they are relying increasingly on the development of thermal generating plants to offset limited

availability of BPA energy resources. In addition to the opposition thermal generation has aroused among environmentalists, it is also unpopular from the standpoint of cost. Thermal-generated power can cost ten times as much as existing hydropower because of the huge amounts of capital required to build thermal plants. Melded with lower-cost hydropower, thermal-generated power has steadily helped to push up rates paid by Portland-area customers of investor owned utilities.

For example, in 1973 when PGE's contract for firm BPA power expired, the utility was charging Portland residents \$14.01 per 1,000 kilowatt hours. By winter 1978, that rate had basically doubled, partly as a result of general inflationary forces, but primarily as the result of more expensively produced power in the supply mix. The cost of this new mix to Portland area residents is highlighted dramatically when compared to the \$11.10 per 1,000 kilowatt hours paid by Vancouver residents for the firm BPA power supplied to them through the Clark County Public Utility District. As long as the BPA preference clause remains in force, and as long as investor owned utilities continue to add thermal power to their supply, the disparity between Portland and Vancouver electricity rates will continue in spite of the acquisition of additional thermal power by the BPA system.

Natural Gas

Portland first turned on gas lights in 1860, using fuel manufactured locally from coal. Much of Portland's gas supplies were generated this way until 1958, when they were replaced by natural gas which had become available by pipeline in 1956. Northwest Natural Gas Company, an investor owned utility, has more than 137,000 customers in the metropolitan area. At least 70 percent of its gas supply comes from Canadian gas fields, while the remainder comes from U.S. sources.

In late 1973, Canadian suppliers began raising the price of natural gas, going from 33 cents per thousand cubic feet at that time to \$2.16 in late 1977. Northwest Natural Gas officials say this dramatic increase caused residential gas customers in the service area to reduce their demand 37 percent by August 1977 from peak usage in 1972. Moreover, Canadian suppliers curtailed gas flow from Canada during each of the three winter seasons prior to 1977. During the 1975-76 heating season, for example, Northwest Natural Gas received about 21 percent less gas than its contract entitlement. However, since then, gas allotments have been above contract entitlements.

Heating Oil

Fuel oil is an important energy commodity in the Portland area, especially for residential space heating. In 1976, 136,660 homes (44 percent of the area's dwellings) were heated by oil. This share is expected to decline in the years ahead. The Portland Energy Conservation Project predicts that petroleum's share of space heating in the new housing market will be 3 percent between 1975 and 1995, while the share of natural gas will be 14 percent and electricity 83 percent. Like other forms of energy, the cost of heating oil has risen dramatically, going from 23.9 cents per gallon in January 1973 to 47.9 cents per gallon as of November 1978. There has been a corresponding drop in consumption: from 1,000 gallons per customer in 1973 to 782 gallons in 1977.

Conservation

The Committee could find no evidence that energy conservation was either practiced or promoted by government, by energy suppliers, or by consumers in the Portland area prior to 1972. It might be argued that the utility-sponsored Medallion Home Program of the 1950s and 1960s which built extra insulation into all-electric homes, was a conservation effort. However, that program was simply part of a marketing effort designed to get more people to use electricity. The extra insulation in the Medallion-rated home was necessary to make electricity more competitive with natural gas and fuel oil, which were less expensive at the time. Insulation in the Medallion Homes did not approach the standards in force today, and most homes heated by gas and oil leaked vast quantities of

heat while gas and oil suppliers competed with the electric utilities for bigger market share.

It was not until 1971-72 that Portland's private electric utilities stopped promoting growth in demand for electricity. In 1972, with loss of firm BPA power less than 12 months away, PP&L issued a report calling for the adoption of stronger insulation standards in home building codes. State and local government, like most consumers, did not wake up to the need for energy conservation until the combination drought-oil embargo crises of 1973-74. It was only natural gas consumers, feeling the sting of late 1972 Canadian price hikes, who were already showing the strong causal relationship economists suggest between high prices and serious conservation.

Since 1974, energy conservation has become increasingly prominent as a public issue.

III. UNDERLYING CONSERVATION ISSUES

The Committee identified at least three underlying questions which bear on local energy conservation efforts. They are:

1. The degree to which energy conservation can or should be relied upon to close gaps between energy demand and supply.
2. The kind of effort, cost, and tradeoffs that can reasonably be asked of individual consumers in order to achieve significant energy conservation.
3. The best way, or combination of ways, to get consumers to conserve energy.

The Role of Conservation in Energy Demand and Supply

Although prices will continue to rise, petroleum-based fuels are expected to be in reasonably good supply in the metro area and the region during the next 20 years. Natural gas supply is expected to improve at least until 1989, when contracts with the Canadians expire. Even if those agreements aren't renewed, Alaskan North Slope gas may be available by then to meet demand. Despite large U.S. reserves of coal, it is difficult to predict the availability of coal to the Northwest region, as well as demand for it here.

Because all of these energy supplies originate outside the region, conservation in their use, even on a massive local or regional scale, will have negligible effect on the supply picture outside the region, and will benefit only the individuals involved. However, according to testimony and documents reviewed by the Committee, conservation of electricity on the local and regional level *can* make a significant difference in reducing pressure on the supply base.

Unfortunately, these same sources agree that it is not likely to make *enough* of a difference to forestall the need for additional supply. New generating facilities will be needed to accommodate continued growth in demand, even though that demand in the utilities' own forecasts would be at least 1.5 percentage points lower than the annual average growth rate of 6 percent experienced in the region from 1964 to 1974. Other forecasts predict even lower growth rates in demand. But virtually all forecasts agree there will be positive growth in demand for electricity.

Given the qualifier that conservation can temper but is not likely to stem future growth in demand for electricity, its potential impact is nevertheless regarded as both measurable and worth pursuing. For example, *Energy Futures Northwest*, the final report of the Northwest Energy Policy Project, notes hypothetically, "if all the uninsulated attics in the region were suddenly insulated to the point of maximum private benefit to each homeowner, the energy saved *each year* would be equivalent to all the energy produced by the 1,130-megawatt Trojan Nuclear Powerplant (in Oregon) over three years of normal operation." [Emphasis added.]

That same report parallels the sentiment of former BPA administrator Don Hodel and other knowledgeable officials that the region would get more energy savings per dollar out of a concerted weatherization effort than out of new thermal generating facilities. Other Committee witnesses went even further. They said any conservation effort which

scaled down the need for new thermal generating facilities would diminish the threat of emergency shortages, impede growth in electricity rates, reduce the need for huge sums of investment capital, and avoid some of the potential environmental hazards associated with thermal plants.

What Price Energy Conservation?

Committee witnesses agreed that energy conservation, despite its broader social and economic advantages, is perceived very narrowly by most people. In most cases, people first ask, "What's in it for me? What does it require of me?"

In other words, the individual is concerned about energy conservation from the standpoint of cost, life style, and equity. Facing any decision about energy conservation which is within his control, the individual is likely to ask, "How much money will its cost or save me? Will I have to give up any of my comforts and conveniences? Will I have to sacrifice more or carry any greater share of the burden than the next person?"

These are important issues because, as the Committee has found, the greatest energy savings usually require the most cost and inconvenience. For example, retrofitting an older home with ceiling and wall insulation and storm windows can save a tremendous amount of energy. However, such improvements can easily cost several thousand dollars. Before most homeowners borrow or assign such financial resources for the good of city, state, and country, they usually want to know how many years it will take to offset the investment. If the answer is six, eight, or ten years, even plotted against rising energy prices, the decision to weatherize is difficult. It is equally difficult for most people to wear a sweater and keep the thermostat at 65°F., even though it will yield significant savings over 70° or even 68°F. (Each degree below 70° will take about 3 percent off an annual heating bill.)

Policymakers, especially elected officials, are sensitive to these issues. Constituents, when confronted with what they consider an unreasonable cost, a harsh or major readjustment in lifestyle, or a disproportionate share of the sacrifice, have ample ability to make their unhappiness known and to resist change. In addition, as some officials have been careful to note, potential energy conservation measures sometimes create other problems. For example, many officials are now concerned about the advisability of wall insulation because there is reason to believe it can form a vapor barrier which collects moisture inside a dwelling's walls, which, in turn, can lead to dry rot.

Such technological conflicts in energy conservation may submit to solutions sooner than socioeconomic conflicts. For instance, a great number of people, and many who appeared before the Committee, believe the best way to achieve energy conservation is simply to let prices rise with the interplay of demand and supply. However, others argue that this market mechanism, while effective, places a disproportionate burden on low income people for whom energy represents a larger share of the cost of living and more of a basic necessity than a luxury. While higher energy costs might persuade middle- and upper-income people to cut back on energy waste, it might force low-income people literally to live in cold.

Given such powerful and often conflicting interests, the task of creating energy conservation policy is made far more difficult. However, without the influence of leadership, and without policy and program initiatives, energy conservation on a meaningful scale is not likely to occur. From the standpoint of state and local leadership, the basic challenge is getting people in the various consumer sectors to adopt a conservation ethic and to make the kinds of capital investments and behavioral changes which will have some measurable effect.

Ways and Means to Energy Conservation

The Committee found that there are at least four basic ways in which energy conservation can be stimulated. The first way is to let market forces drive prices up and consumption down. As noted, above, while this mechanism is effective (and will undoubtedly

play an important role in conservation in the years ahead), it also will victimize many low-income people unless some policy provisions are made to minimize this undesirable side effect.

The second approach, which is more active, seeks to educate and inform people about energy and energy conservation, and to persuade them to adopt new behaviors and practices. Vehicles for doing this include posters, films, booklets, pamphlets (such as bill stuffers), newspaper ads, radio and television public service announcements, journalism articles, formal classes, and appeals by public officials. Unfortunately, among the people who talked to the Committee, few are optimistic that this approach, by itself, will have much long-range impact. The Northwest Energy Policy Project concluded that persuasion and education are most effective as a means of reducing energy demand during short-run emergency shortages.

Incentive policies and programs represent the next level of initiative in stimulating energy conservation. Incentives typically take such form as tax credits, low-interest loans, subsidies, and the like. Disincentives, which penalize certain levels of energy consumption, also fit this category. The scheduled federal tax on new "gas guzzler" cars is a good example of a disincentive. By themselves, and unless they are fairly substantial, incentives or disincentives aren't sufficient to compel people to conserve energy. However, if they are inclined to do so out of civic conscience or economic self-interest, these reinforcements will make it easier for them to follow through.

There is some support in energy conservation circles for incorporating incentive/disincentive policy in the utility rate structure itself. And in Oregon this is being tried on a limited basis. In July 1978, the Public Utility Commissioner ordered the electric utilities to charge "season-of-use" rates to residential consumers and "time-of-day" rates to volume industrial consumers.

Under the season-of-use structure, a home using 1,000 kilowatts a month — a typical residential use — pays about \$2 per month more in the winter than in the summer. Volume industrial customers pay higher rates for electricity purchased during peak use periods of the day (6 a.m. to 10 p.m. weekdays). Proponents of this policy believe it sends a clear conservation message to the consumer, and many of them would like to see the price differential increase.

Some people have also expressed support for "life line" electric utility rates. Such rates would price a certain "basic need" block of electricity at a lesser cost than consumption deemed to be more extravagant. A key assumption of the life line rate concept is that it benefits low income consumers because they are believed to use energy less extravagantly than others. However, two recent studies, one by the Public Utility Commissioner, one commissioned by the City of Portland, suggest that the life line rate structure would be more likely to penalize low income consumers than to help them. These studies also indicate that the concept is plagued by other social inequity problems, and they raise doubts about the degree to which it would actually motivate people to conserve energy.

Mandatory policies constitute the most severe public attempt to achieve energy conservation. Building codes are probably the best example. Another is reservation of certain freeway lanes for the use of car pools, buses, and other high occupancy vehicles which yield more efficient use of transportation fuels. Oregon's Land Conservation and Development Commission goals mandate energy conservation in land use planning. With the exception of building codes, however, mandatory policies do not generally enjoy wide use as a method of achieving energy conservation.

IV. DISCUSSION OF FINDINGS

Energy Conservation in the Residential Sector

About 21 percent of Portland-area energy is consumed in residential dwellings. More than 65 percent of these residences are owner-occupied units, most of them single-family structures. The remaining rental units are mostly part of multiple-family buildings.

By far, space heating makes up the largest share of residential energy consumption — 71 percent of the household energy budget according to the Portland Energy Conservation Project. Water heating follows at 14 percent, miscellaneous appliances at 11 percent, and electric lights and gas pilot lights at 4 percent combined. As a consequence, most Committee witnesses agreed, insulation and other weatherization measures which conserve space heat offer the greatest potential for energy savings in residential dwellings.

In the Portland area (and the rest of Oregon) owner-occupied, single-family dwellings have attracted the greatest amount of energy conservation policy and program action; and conservation of space heat is at the heart of most efforts. Rental residences have received relatively little attention.

There are more than 276,000 single-family residences in Multnomah, Clackamas, and Washington counties. From the standpoint of space heat conservation, such residences fall into two categories of scrutiny: new homes, where the key issue is mandatory building insulation standards, and *old homes*, where the focus is on incentives to get homeowners to retrofit their dwellings with insulation materials. Although most space heat conservation policies and programs have been statewide in scope, Portland-area leaders have had a role in these developments, particularly through the state legislature.

New Homes and Insulation Standards

The rationale for installing adequate insulation in new homes is sound. At no time is it easier or cheaper to insulate a dwelling than when it is being built. And, of course, its energy conservation effect is ongoing. As a Clark County Public Utility District official told the Committee, "Once it's done, it's done, and you don't have to rely on the diligence of the people who live there to conserve. People may be pretty good for a short time, especially if there's an energy emergency. But it's hard to keep up their conservation consciousness. If the insulation is there to start with, it just keeps on working." Moreover, it requires little if any maintenance and it usually lasts the life of the structure.

However, it has been difficult to find agreement on what constitutes the right amount of new-dwelling insulation. In 1974, Oregon adopted its first insulation requirements. As a result, Chapter 53 of the *Structural Specialty Code* included among its more prominent residential insulation requirements heat-loss resistance (R) standards: R-19 for ceiling insulation (equivalent to about six inches of fiberglass material), R-11 for walls, and R-9 for floors. The standards were upgraded in March 1978 to include double glazing of windows. In January 1979, they were raised to R-30 for ceilings (requiring about 12 inches of insulation) and R-19 for floors. While backed by the electric utilities and by conservation-minded opinion leaders, some of the new standards have been opposed by homebuilders as economically impractical (either in terms of higher new-unit cost or slow energy-saving payback). Controversy erupted in October 1977 when the construction-oriented Structural Codes Advisory Board (appointed by the director of the State Department of Commerce) rejected stringent insulation standards proposed by the Energy Conservation Board (appointed by the governor). The SCAB not only objected to many of the ECB's residential insulation standards, it totally rejected ECB code recommendations for energy conservation in new commercial buildings. After publicly trading accusations about each other's unreasonableness, the two sides a short time later reached a compromise agreement which excluded the commercial code recommendations. (As discussed later in this report, compromise commercial standards were adopted nearly a year later.) However, because the insulation industry has been having trouble keeping up with demand for materials, there is still some uncertainty whether the new residential insulation standards can be met on schedule.

Despite these skirmishes and temporary uncertainties, the Committee believes that in the Portland area (including Clark County) new insulation codes insure that the housing stock will become more energy efficient as new homes are built and as older dwellings are replaced.

Older Homes

Because most older homes are well built, they will probably be around for generations. (The demolition rate on old dwellings is only one half percent per year.) The Portland Energy Conservation Project estimates that 67 percent of all the homes standing today within Portland's boundaries were built before 1950. Using housing statistics supplied by Portland General Electric, the Committee calculates that nearly 87 percent of all the existing single-family housing in the Portland area was built before the advent of Oregon's first insulation codes in 1974. Thus, it is clear that older housing will continue to dominate residential energy consumption well beyond the turn of the century.

According to the best estimates available, the energy efficiency of this older housing stock leaves much to be desired. In a 1977 study report to the Northwest Energy Policy Project, the Environmental Research Center at Washington State University estimated that among regional houses built before 1977, "at least 20 percent . . . have no insulation, another 25 percent have minimal ceiling insulation only, and the rest generally have about half as much insulation as would now be considered desirable."

The Committee believes that the Portland area reflects this regional situation. Most energy officials interviewed by Committee members were either explicit or implicit in the view that most of the metropolitan area's older homes are poorly insulated and that significant energy savings would result from large-scale programs to retrofit them with insulation.

There is additional support for this perspective in a sample survey commissioned by Portland General Electric and completed by the Bardsley and Haslach research firm in the fall of 1977. Entitled "The Insulation Picture in PGE Country," the study provides an interesting, detailed picture of insulation among 502 electrically-heated and 302 nonelectrically-heated households served by PGE. The study yields three important categories of findings: energy conservation steps homeowners had taken voluntarily between 1974 and 1977, adequacy of weatherization in the homes surveyed, and the perceptions and attitudes of survey respondents about their home weatherization.

Homeowners reported that they *did* initiate some conservation measures in the three years leading up to mid 1977:

- 81 percent said they had cut back in the use of lighting,
- 70 to 75 percent reported lowering thermostats during the night, 70 percent during the day,
- 31 percent said they had added storm doors and windows,
- 36 percent said they had added weatherstripping,
- 30 percent in electrically-heated homes and 35 percent in nonelectrically-heated homes said they had increased the insulation in their dwellings.

While those findings seem promising, there is less to cheer in the actual level of insulation found in the survey homes:

- 76 percent of electrically-heated homes and 81 percent of the nonelectrically-heated homes were below the new minimum state standard of R-19 insulation for ceilings. About half of all homes surveyed ranged between R-13 and R-8.
- 94 percent of all water heaters had no additional outside insulation, and 62 percent of them were in unheated areas. In 78 percent of the units, hot water pipes leading into the household plumbing system were uninsulated.
- Although weatherstripping was common, most door and window frames were not caulked.
- Among dwellings with crawl spaces, floorboards over the crawl spaces lacked insulation in 73 percent of electrically-heated homes and 87 percent of nonelectrically-heated homes.
- More than 61 percent of all homes had fireplaces, and most of them lacked glass screens to retain household heat when not in use.

Despite these findings, 40 percent of electric-heat homeowners and 30 percent of nonelectric-heat homeowners rated the insulation of their dwellings as "very adequate." Respectively, only 18 and 21 percent perceived their insulation as generally inadequate. However, there was a large gray area of uncertainty. Forty-one percent of the electric-heat homeowners and 47 percent of the nonelectric-heat homeowners regarded their insulation as "somewhat adequate." Perhaps that is why more than half of those surveyed said they plan to add insulation to their home sometime in the next three years. Most of them mentioned intentions to install additional wall, ceiling, and floor insulation. Forty percent of those who said they intend to add insulation included storm windows in their plans. Incidentally, respondent judgments of what would constitute an acceptable payback period (the time of investment recovery through monthly heat savings) averaged five years.

While such intentions sound promising, there is no way to know how serious people are in expressing them. The discrepancy between actual levels of insulation found in the survey and the perceived adequacy of insulation on the part of homeowners suggests a substantial amount of self-deception at worst or ignorance at best.

Most of the officials interviewed by the Committee were skeptical about the willingness of homeowners to make insulation investments in return for energy savings. Myron Katz, director of the Northwest Energy Policy Project, told a City Club luncheon audience on February 24, 1978 that he believes people, in the absence of a perceived crisis, will not begin to get serious about conservation until the cost of energy begins to hurt their pocketbooks.

Policies and Programs for Encouraging Weatherization of Older Homes

In regard to the Portland area, the State of Oregon executive branch, the 1977 state legislature, and the Portland area's two private electric utilities have taken the only significant lead in offering energy conservation programs for residential dwellings built prior to the influence of the state's 1974 building insulation codes.

Excluding legislation intended to encourage alternative home energy devices, the 1977 legislative session produced six residential energy conservation measures. The most significant of these were HB 2157,² HB 3265,³ and HB 2156.⁴ HB 2157 requires Oregon's six investor owned gas and electric utilities to help their residential *space heating* customers by supplying them energy conservation information, on-site weatherization evaluation and consultation, and assistance in acquiring financing for weatherization at a state-subsidized 6½ percent interest rate. HB 3265 is similar in structure and intent but pertains to the state's 31 publicly owned utilities and its 300 or so fuel oil dealers.

HB 2156 requires homes built before the advent of the July 1, 1974 state insulation standards to be retrofitted to those standards before they can qualify for financing through the Department of Veterans' Affairs. Under this program, weatherization costs are added to the principal of the loan and paid off over the life of the mortgage at the interest rate currently in effect. The only mandatory energy conservation law to come out of the 1977 session, HB 2156 is significant because the Veterans' Department makes one of every four home loans in Oregon. In mid July 1978, the Governor's office announced that the program, in the first eight months of its existence, accounted for the weatherization of 10,000 Oregon homes, roughly half of them in the Portland area. Another 15,000 homes were expected to be weatherized through the program in the 12 months following the announcement.

The National Energy Act of 1978 proposes that the federal government study the feasibility of imposing such a nationwide requirement through its home mortgage assistance programs. The Portland Energy Conservation Project estimates that such a home weatherization requirement at point of sale could save nearly 29 percent of the home

²1977 Oregon Laws, Chapter 889

³1977 Oregon Laws, Chapter 887

⁴1977 Oregon Laws, Chapter 383

energy that might otherwise be consumed between now and 1995 in the metropolitan area. The average life of a mortgage in the Portland area is about seven years, so most older homes would be affected by such a provision within two decades.

The 1977 state legislature created two other weatherization incentive programs which deserve mention. HB 2701⁵ provides homeowners a tax credit of \$125 or 25 percent of the cost of weatherization, whichever is less. The Committee believes this provides an additional, useful incentive for those who might already be inclined to undertake some home weatherization, but its benefits are not substantial enough to provide exclusive motivation along these lines.

SB 46 provides reimbursement of up to \$300 for weatherization of a home owned by a low-income, elderly person. An article in the October 10, 1978 issue of *The Oregonian* reported that 2,000 persons took advantage of this program in 1977 at an average refund of \$235.

The National Energy Act will allow homeowners to take a tax credit of 15 percent on the first \$2,000 spent for home insulation, storm doors and windows, and other energy-saving fixtures, up to a total credit of \$300. The credit may apply to improvements made as far back as April 20, 1977, the day President Carter submitted his energy bills to Congress. The Committee believes that the federal incentives are only slightly more compelling than State of Oregon incentives.

The "PP&L Plan"

By themselves, HB 2157 and HB 3265 make home weatherization economically feasible and even somewhat attractive. However, neither approaches the attractiveness and ease of a weatherization assistance plan proposed in April 1978 by Pacific Power and Light, emulated in a June proposal by Portland General Electric, and approved for both utilities in July by the Public Utilities Commissioner.

Under the deferred repayment loan program, or the "PP&L Plan" as it is informally known, the utility finances the cost of needed weatherization on an electrically-heated home as an interest-free loan and then defers the repayment of the principal until the dwelling is sold (or its ownership is transferred by another means). In providing this service, the utility conducts a home energy audit, advises the owner of cost effective weatherization steps that should be taken, and then obtains bids from contractors chosen by the utility and the homeowner. After the weatherization work is completed, the utility inspects the job and makes arrangements for any follow-up adjustments needed to meet contract specifications. As an added bonus, the utility will — free of charge — install insulation around any water heater located in an unheated space. Only single family homes built before mid 1974 are eligible, and wall insulation is excluded from the package because of its potential to collect moisture and cause dry rot.

As a practical matter, utility officials expect the PP&L Plan to supplant the assistance program required by HB 2157. Technically, however, it is an option to the legislature's plan; and a customer may choose a financing program under the provisions of HB 2157. The PP&L Plan is attractive because it offers the homeowner a means of getting immediate conservation benefits without immediate cost. Later, when the home is sold or its ownership is transferred by other means, the weatherization will have yielded significant energy and utility bill savings, it undoubtedly will have added to the market value of the house, and its interest-free cost will be easy to repay as a fraction of the dwelling's equity value.

According to the April 4, 1978 issue of *The Oregonian*, which reported PP&L's April 3 unveiling of the plan, company president Don Frisbee said PP&L devised the plan because it had spent the past two years trying unsuccessfully to get customers to take advantage of tax incentives and low interest rates in order to insulate their homes.

"The average energy consumer just doesn't give a darn about long-run economics,"

⁵1977 Oregon Laws, Chapter 811

⁶1977 Oregon Laws, Chapter 716

Frisbee was quoted, "Even when convinced that he could save money on his power bill, he will take a trip to Hawaii or buy a new car before he will insulate his home, even with a 6 percent loan and tax credits."

Although the plan is expected to be of great benefit to electric-heat households in need of additional weatherization, the Portland area's electric utilities have proposed it primarily because it is much cheaper to offset electricity demand through insulation than it is to meet that demand through construction of new generating facilities. In proposing the plan to the Public Utility Commissioner, PP&L estimated that new generation to meet residential heating requirements would cost more than 4.2 cents per kilowatt hour. Insulation to forestall that need, the utility estimated, would cost about 1.8 cents per kilowatt hour saved. In its proposal, PGE estimated comparative costs of 4.5 cents and 1.5 cents per kilowatt hour, respectively.

Commissioner Charles Davis, in approving the plan, said its use by the two utilities is expected to permanently defer 127 megawatts of generating capacity — enough to supply electricity to two cities the size of Medford. Davis compared the plan in importance and innovation to the Oregon Bottle Bill passed in the 1973 state legislature. The plan may be new in the utility business, but the concept has been applied elsewhere. The past five years, the Portland Development Commission has offered no-interest, deferred-payment home improvement loans of up to \$4,000 to low-income and elderly homeowners in designated neighborhoods. Nearly 700 such loans were made in 1977, and portions of many were used for weatherization.

By the end of 1978, the deferred repayment loan program showed promise of becoming a great success. Because of the time required to develop procedures, as well as to hire and train staff, the PGE program wasn't fully operational until the end of September, and the PP&L program wasn't running full speed until late November. However, during the time between then and the end of the year, both had begun to do brisk business. PGE had already completed 3,660 home energy audits and financed weatherization for 3,111 of the 80,000 electrically-heated homes in its Portland service area (for an average of 200 loans per week). (By comparison, only 94 of its customers had chosen the low-interest weatherization loan option afforded under HB 2157.) Among its 70,000 space heat customers throughout Oregon, PP&L had completed nearly 2,000 home energy audits, scheduled another 3,000, financed weatherization on 507 bid awards, and placed another 600 weatherization jobs out to bid. In the Portland area, where it has only 5,600 electrically-heated homes, the utility had financed 47 bid awards and placed another 16 jobs out to bid.

Officials of both companies are pleased with the start their programs have made. PP&L is optimistic it can meet its goal of weatherizing 70 percent of its eligible customer homes within the next five years. PGE hopes to weatherize a minimum of 30,000 homes through the program by the end of 1981.

But despite the program's apparent success, it will affect only a fraction of the Portland area's residences. According to the Portland Energy Conservation Project, electricity accounted for only 14 percent of the area's residential space heating in 1975. That same year natural gas heated 34 percent of the area's homes, and fuel oil heated 50 percent.

Thus the most attractive and feasible insulation financing plan for Portland-area homes built before mid 1974 does not apply to about 80 percent of that housing stock. The PP&L Plan is not economically feasible for Northwest Natural Gas and the area's fuel oil dealers. While the plan is economically advantageous for private electric utilities (because it helps defer the enormous capital requirements of new generating facilities), it offers no economic benefits to these fossil fuel distributors. They actually suffer financially (at least in the short run) from reduced customer need for their products. Therefore, provisions under HB 2157 and HB 3265 will have to carry the brunt of the load as financing incentives for the insulation of the area's older homes.

Fortunately, these state-subsidized, low-interest loan programs also appear to be

attracting consumer interest. Northwest Natural Gas had its program fully operational by September 1978. By the end of the year, it had completed nearly 1,600 home energy analyses, scheduled more than 1,000, and awarded 480 weatherization contracts. (The utility financed 289 of these; in the remaining cases, consumers paid cash.) The Oil Heat Institute reports that fuel oil dealers had their weatherization assistance program operational by the first of August 1978. By the end of the year, they had completed nearly 1,300 home energy analyses. Unlike the utilities, the oil dealers help steer customers to weatherization financing rather than furnish it. Therefore, they don't know how many oil heat customers have obtained low-interest loans under the provisions of HB 3265. According to the Oregon Department of Energy, that information will not be available until after April 1979, when financing institutions which have supplied the loans apply to the state for tax credits on them.

Residential Rental Units

Like the vast majority of the area's single-family residences, most of the area's 94,000 multiple rental units were built before 1974. And like the single-family homes of that earlier, cheap-energy era, these rentals are not adequately weatherized.

An analysis of this problem in the December 24, 1978 issue of *The Oregonian* aptly sums up the matter: "Few of the state financial incentives for weatherizing apply to renters or building owners. And little use is made of the incentives that do apply because landlords by and large don't go along with voluntary programs." As the article notes, apartment owners could obtain low-interest weatherization loans under the provisions of HB 2157 and HB 3265. However, only a few have. The rest pass on the higher heating costs to their tenants.

Most Committee witnesses familiar with this issue feel that it won't be resolved until some adequate incentives are developed to make weatherization attractive to building owners. In regard to the economics of rental dwellings, the City of Portland's Energy Policy Steering Committee points out in a recent policy development paper, "there are virtually no incentives to encourage retrofit of investor-owned properties."

Energy Conservation in the Commercial Sector

The commercial sector comprises a broad grouping of buildings⁷ that account for about 10 percent of the area's total energy consumption. Although the Portland Energy Conservation Project estimates there is potential for reducing consumption in this sector by 43 percent, that potential is apparently a long way off from realization.

The Committee found that there are three principal impediments to the formation of comprehensive policies and programs in this sector. First, commercial sector energy consumption is difficult to quantify and analyze because of the way commercial buildings differ in physical structure, use, and the internal systems which make them habitable. Second, there is not a sufficient data base on the history, efficiency, and outlook of energy use in this portion of the local economy. Without such information, it is difficult to determine what can and should be done to improve conservation. Third, among all the parties concerned with energy use in this sector, there is substantial disagreement over the methods by which energy savings should be pursued.

The Problem of Determining How Energy is Used in the Commercial Sector

Committee witnesses disagreed over the extent to which state or local government should be setting policies and creating programs in order to achieve greater energy conservation in the commercial sector. However, there was little doubt that not enough is known about commercial sector consumption — and waste — for such policy and program initiatives to go forward intelligently.

⁷Office buildings account for 8 percent of the commercial sector share of energy consumption; service buildings such as hospitals and schools use 43 percent; and retail and wholesale buildings consume 49 percent. Functionally, lighting accounts for 30 percent of commercial consumption. This is followed by space heating, 21 percent; air conditioning and ventilation, 18 percent; refrigeration, 16 percent; water heating, 14 percent.

As noted above, commercial energy consumption is complicated and diverse. Every building differs in size, shape, exterior covering, internal systems, and use. Internal systems are particularly important because they are the chief determinants of consumption. Thus, it is essential to know how buildings consume energy in lighting; in heating, ventilating, and air conditioning (commonly called HVAC systems); in refrigeration; and in water heating.

Stan Goodell, executive vice president of the Building Owners and Managers Association (BOMA), illustrated this problem by pointing out that most Portland office buildings are controlled by either of two types of HVAC systems, "dual duct," or "variable volume." The dual duct system, he explained, supplies a constant mixture of both heated and cooled air to a space in order to maintain a particular climate. This system is wasteful but prevalent in older buildings. The variable volume system provides a constant temperature of air flow to a space, but, as its name implies, maintains the climate of the space by varying the volume of that air flow according to need. Goodell said no one knows precisely how many buildings are fitted with either of the two systems. He said just as little is known about the type and distribution of lighting systems, boilers, fans, and other equipment. Without such data, policy makers can't properly assess the sector's conservation needs and problems.

The Oregon Department of Energy has initiated studies of key energy consuming industries in the state, and the findings are expected to be useful in determining future energy policies for that sector. However, no similar fact finding effort has been undertaken for the commercial sector. Private utilities have much of this information but report a reluctance to release it without the permission of their commercial customers. Goodell said BOMA plans to ask its members to give the utilities permission to release such information. However, even if every BOMA member were to comply (which can't be assumed), the association doesn't include enough of the area's commercial building owners to give an adequate picture of energy use. It appears to the Committee that nothing short of a government mandate will generate this needed data base.

Conservation Attitudes in the Commercial Sector

Although energy use data is sketchy in the commercial sector, there is one piece of research which suggests strongly that commercial building owners and lessees are not conservation minded. During the summer of 1978, PGE interviewed 100 of its commercial customers about conservation efforts they had taken or planned to take. In a document entitled "Survey of Customer Attitudes Towards Conservation in the Commercial Sector," the utility reported these findings:

- Only 4 percent of those interviewed had made capital investments in energy conservation.
- Only 25 percent planned any future energy conservation measures, and only 20 percent of that minority planned measures requiring capital investment.
- Less than half showed any interest in low-cost conservation loans.
- These attitudes varied little according to type of heating fuel used in a building, according to whether the respondent was an owner or lessee, or according to the type of business.

Disagreement Over Conservation Approaches in the Commercial Sector

The Committee found two different preferences for pursuing energy conservation in the commercial sector. One camp favors a voluntary approach. People in this group believe building owners and managers should conserve energy in response to voluntary conservation standards, or the rising cost of energy, but not to mandatory requirements. The other camp favors code changes which will result in wider adoption of energy efficiencies in commercial structures, especially new ones. Adherents in this group include the Portland Energy Conservation Project, which has expressed the opinion that Portland's commercial sector will not realize its potential of 43 percent energy conservation

without code changes that mandate compliance. Marion Hemphill, the City of Portland's energy specialist, said he believes that the PGE study illustrates how much needs to be accomplished yet in the commercial sector.

Despite the results of the PGE study, the Committee found that a number of the Portland area's commercial building owners have achieved noteworthy levels of energy saving. For example, during the drought-oil embargo years of 1973-74, many buildings reduced annual consumption 10 to 20 percent in both years. The Jantzen Beach Shopping Center has cut consumption by 50 percent since opening in 1972. Committee interviews with owners and managers of prominent new office buildings in downtown Portland (First National Bank, Georgia-Pacific, 200 Market, Blue Cross, Boise Cascade, Ben Franklin, Standard Plaza, and Willamette Center) reveal significant conservation measures and accomplishments. In 1977, the annual reduction in energy use for these buildings ranged from a low of 20 percent to a high of 47 percent.

For the most part, these savings were achieved by intensive management rather than capital investment in facility alterations. In some cases, managers have undertaken a "Phase 2" effort involving a detailed audit of the building's energy efficiency. However, this phase, which is the logical prelude to changes requiring capital investment, has been resisted by some owners who are reluctant to initiate additional conservation measures which incur direct costs. When interviewed by the Committee, most building owners said they expect investments in energy conservation to meet the same capital recovery requirements that are applied to other investment possibilities.

The cost of energy alone might justify such improvements, but the problem isn't quite that simple. According to Carl Fullman, a local mechanical contractor who is past chairman of the state's Energy Conservation Board, some owners erect buildings only to sell or lease them, which results in their operating costs being passed on to others. This circumstance, said Fullman, removes the owner's incentive for installing the most energy efficient HVAC systems. The owner instead opts for more wasteful systems that lower the construction cost per square foot. Fullman said he supports energy conservation codes for new commercial buildings in order to prevent such irresponsibility and to insure energy efficiency throughout the life of the structure.

Roger Conkling, senior vice president for Northwest Natural Gas, argued a slightly different point in favor of mandatory energy conservation codes for both new and older commercial buildings. Aside from the cost of retrofitting, he noted, commercial firms tend to be hesitant about adjusting lights, ventilation, and temperature for fear that these changes will make their buildings less attractive to customers. Conkling said he believes that uniform codes will remove any temptation of one business to assume an edge over its competitors by offering brighter lights and warmer interiors at the expense of prudent energy use.

A Mandatory Energy Conservation Code for New Commercial Buildings

In October 1977, as noted earlier, the state's Structural Codes Advisory Board rejected the Energy Conservation Board's recommendations for conservation standards in new commercial buildings. Because localities historically adopt state building codes, Portland-area governments had to wait until September 1978 before the feuding advisory boards agreed for the time being on some watered down standards.

The original ECB recommendations were based on two models, the so-called ASHRAE 90-75 standards⁸ for HVAC systems, and Chapter 53 of the Uniform Building Code of the International Conference of Building Officials. Walter M. Friday, chief structural engineer for the state's Building Codes Division (as well as executive secretary to both ECB and SCAB), told the Committee he has supported the ECB's recommendations as professionally sound. However, he cited two principal sources of opposition to them within the SCAB membership. An architect member of the board strongly opposed the new codes because he felt they would enlarge state bureaucracy and would interfere

⁸American Society of Heating, Refrigeration, and Air Conditioning Engineers.

with the role of architects and engineers in designing buildings. In addition, the Masonry Institute of Oregon opposed the new standards because they appeared to preclude the use of some masonry products in new commercial structures.

According to Friday, the Masonry Institute's viewpoint prevailed among the SCAB members and it appeared that commercial building conservation standards would continue to be stalled. However, a year later, the two boards finally agreed to the original ECB recommendations minus thermal insulation standards for exterior walls. These new recommendations were scheduled to go into effect in January 1979.

Friday said the issue probably will not rest. He speculates that the 1979 state legislature will be asked to take some action on commercial energy conservation standards, including the deleted standards on walls. He said he feels the wall standards are needed. The Committee found that the 1977 legislature wrote very little law on energy conservation in the commercial sector. Its singular accomplishment in this respect was HB 2155⁹, which set mandatory lighting standards for commercial buildings constructed after July 1, 1978.

On this issue, there is one interesting sidelight which suggests that localities may not have to wait for state action. In January 1978, the Oregon Supreme Court upheld the right of the City of Troutdale to adopt more stringent structural codes (in this instance, related to safety) than those required by the state.¹⁰ According to attorneys familiar with the case, this precedent gives localities a legal foundation upon which to exceed state building standards if, for some reason, those standards are not regarded as adequate. Whether the localities would exercise such an option on behalf of energy conservation remains to be seen. Local officials generally acknowledge that the state is in a much better position to establish and administer the various provisions of the structural code.

Energy Conservation in the Industrial Sector

Manufacturing accounts for 39 percent of the Portland area's energy consumption, a share which exceeds the combined total for the residential, commercial, and government sectors. Because the area's industrial base is diversified, energy is used for many different purposes, among them, producing primary metals, powering machinery, creating production process heat, and heating and cooling space.

The biggest energy users are those industries, like aluminum and pulp and paper, which depend heavily upon energy as a main ingredient in the production process. Since 1972, industrial use of electricity has grown. During that same period, consumption of petroleum and natural gas has declined.

The Portland Energy Conservation Project estimates that there is potential for local industry to reduce its current level of energy consumption by 5 to 12 percent, and possibly even more. However, that study concedes that industrial conservation potential is extremely difficult to quantify.

Industrial Trends in Energy Conservation

The Committee found that there appears to be a dual conservation trend among local companies. Large concerns show substantial progress in energy savings. However, the story is very different among small- and medium-sized firms.

Marion Hemphill, the City of Portland's energy specialist, said the following conclusions of the Portland Conservation Project apply primarily to small and medium firms in the area:

- They don't perceive an energy crisis until it comes home to them in the form of power interruption notices.
- Energy is only a small portion of their production cost, and an increase in energy price has a small impact on production.
- They find it relatively easy to pass increased energy costs on to the consumer.

⁹1977 Oregon Laws, Chapter 354

¹⁰State of Oregon ex rel Haley v. City of Troutdale, 281 Or 203 (1978)

- Their capital resources are limited, and they would prefer to use their available capital to increase production or reduce labor requirements rather than reduce energy requirements.

As Hemphill summed it up, "They have to worry about survival first. They see energy conservation as a luxury. The larger firms pay out more for energy as part of the production process, and they have the technical personnel to look after conservation efforts."

In a random survey of some larger companies in the Portland area, the Committee found a high level of energy consciousness. In particular, large firms view conservation as a hedge against rising energy costs and the uncertainty of energy supplies.

Their commitment is evidenced in part by the amount of "payback" time they will allow for capital investments in energy conservation. On nonconservation investments, they expect savings or increased earnings to offset or exceed capital requirements within six months to three years. However, on conservation investments, most firms contacted by the Committee are willing to accept a payback period of from two to five years. Two companies said payback time was not a consideration in their energy conservation investments. They rated energy conservation as a "good neighbor" investment in the community, along with such intangibles as public relations and landscaping.

Following are some brief, random accounts of energy conservation activities the committee found among large local companies:

Reynolds Metal Company, Troutdale and Longview. Reynolds reports that since 1942, it has reduced the amount of electrical energy required to make a pound of aluminum from 12 kilowatt hours to less than 8. It broke below 8 kilowatt hours in 1969 with the introduction of what it calls "modified bath technology," a method of using certain chemical additives which increase the efficiency of the electrolytic process by which aluminum oxide is reduced to aluminum. In 1975 Reynolds changed its method of making carbon anodes, which has resulted in a 10 percent saving per year in natural gas consumption.

Tektronix, Beaverton and Wilsonville. Unlike most local industries which consume most of their energy in the production process itself, Tektronix consumes 80 percent of its energy supply in space conditioning and lighting. During the 1977 regional energy crisis, the company accomplished a 10 percent reduction in consumption by shutting down unessential air conditioning, reducing lighting levels, and modifying space temperatures. Energy conservation was a key design consideration in the company's Wilsonville facility. Consequently, it uses only a third as much energy for a comparable amount of space as do older company buildings on the Beaverton campus.

The company is presently installing a centralized computer control system which is designed to make more efficient use of energy for space conditioning and lighting. Because Tektronix anticipates energy costs will rise 15 to 20 percent a year, it believes conservation is a sound investment.

Columbia Steel Casting Company, Portland. CSC consumes about 1,000 kilowatts of electricity and 1,000 therms of natural gas in producing each ton of castings. In the past four years, the company has achieved roughly 50 percent savings in natural gas use by installing more efficient gas burners, lightweight insulation materials, and new controls. The company plans to concentrate its future conservation efforts on recovery of heat from its heat treat furnaces. It believes there is little potential for conservation of electricity in the foundry industry.

Publishers Paper Company, Oregon City, Newberg, and Tillamook. Publishers has replaced an oil-fired boiler at its Tillamook plant with one fired by hog (wood waste) fuel. In addition, it has installed a turbine generator for electricity cogeneration at that facility, a measure it has also instituted at its Newberg plant. In conjunction with the Metropolitan Service District, the company is planning the installation of a boiler that will annually convert 400,000 tons of municipal waste to steam and electricity for use at its Oregon City paper mill. Publishers has also developed a process of de-inking news-

paper newspaper, resulting in substantial conservation of electricity in the recycling process.

Oregon Portland Cement Company, Lake Oswego and Eastern Oregon. OPC invested heavily in converting its Lake Oswego plant from oil to coal heat. The company is building a new plant at Durkee, Oregon, which will use about half the energy per ton of product that its current operations consume.

Conservation Policies Affecting Local Industry

The Committee found very few government policy mechanisms which either encourage or mandate energy conservation in local industry.

During the hydroelectric shortage of 1977, Governor Straub requested industries in Oregon to reduce their electricity consumption by 10 percent. That goal was met. However, local government has not yet taken a direct role in industrial energy conservation.

Except for Straub's appeal, local manufacturers have been subject only to the voluntary conservation goals established by the federal government in the Energy Policy and Conservation Act. Administrative guidelines published in June 1977 set energy conservation targets which industries throughout the nation are supposed to achieve by January 1, 1980. These range from 10 percent savings in the primary metals industry to 24 percent savings in fabricated metals. Within that range fall chemicals, ceramic products, paper, food, and other items produced in the Portland area.

A Northwest aluminum industry spokesman told the Committee that his industry has achieved an 8½ percent energy consumption reduction since its 10 percent conservation goal was set by the Energy Policy and Conservation Act.

Industry spokesmen interviewed by the Committee oppose the notion of government-imposed energy conservation standards on the production process. Many noted that it is difficult for government to create fair, comprehensive energy conservation policy for industry, primarily because industry uses so many different forms of energy in so many different ways. Others feel they are burdened with enough government regulation as it is.

While it doesn't propose energy conservation policy for local industries, the Portland Energy Conservation Project does explore a number of policy options which might be considered. It doesn't believe educational and promotional programs would have much effectiveness and it doesn't believe industrial energy efficiencies can be mandated. But it does see merit in such incentive programs as conservation investment tax credits, accelerated depreciation for new equipment that meets certain energy efficiency standards, low interest government loans for installation of energy saving equipment, and a small energy tax whose revenues would be earmarked for conservation activities. The City of Portland's Energy Policy Steering Committee may endorse some of those incentive options.

In addition to the general investment tax credit of up to 10 percent which a company may claim on its federal tax return, the Energy Tax Act of 1978 allows an additional credit of 10 percent for installation of energy conservation equipment or other equipment which meets federal energy goals.

What Local Governments Are Doing About Energy Conservation

Government operations account for only 3 percent of the Portland area's energy consumption. According to the Portland Energy Conservation Project, city and county government make up nearly 2 percent of that total while public schools account for slightly more than 1 percent. But even if they don't consume much more than a sliver of the area's energy share, local governments do have the potential to exert substantial leadership on behalf of energy conservation.

To see if that potential is being realized, the Committee looked at the energy conservation activities of both general and special purpose governments in the Portland area. Because these include 37 incorporated cities, four county governments, and a multitude of special agencies and governing districts, the Committee restricted its focus to the more prominent jurisdictions on the Oregon side of the Columbia River, especially the City of Portland and Multnomah, Washington, and Clackamas counties. In particular, the com-

mittee inquired into 1) the kinds of energy conservation policies, programs, and services that local governments are instituting through their governing authority, and 2) the kinds of measures that local governments have taken in order to conserve their internal use of energy.

Energy Conservation Policies and Programs Among Local Governments

Local general purpose governments can create energy conservation policies and programs by three principal means. They can enact conservation ordinances through their legislative powers. They can pursue conservation goals in comprehensive land use planning. And they can exercise their administrative options — building energy-saving objectives into routine services, internal operations, and capital budgeting.

Most Portland-area jurisdictions are pursuing the latter two avenues in various degrees. However, the City of Portland appears to be the only locality which may go beyond the normal housekeeping range of its legislative prerogatives in order to create energy conservation law.

If Portland is unique in this respect, it is because of some unique circumstances, chief among them the Portland Energy Conservation Project (PECP) and the city efforts which have grown out of it.

Begun in 1975 and completed in 1977, the PECP was a major research and policy development project funded by the U.S. Department of Housing and Urban Development. The project had several key goals, among them to accumulate an energy use data base, to develop techniques for analyzing and creating conservation strategies, and to develop a capital budgeting process designed to encourage energy efficiency in city government operations.

Using both primary and secondary resource data, the study generated a profile of energy uses and conservation potentials for both the greater Portland area and the City of Portland itself. Its nine volumes (see Appendix B) have been invaluable to the Committee in this research effort.

The PECP spawned two significant undertakings, the formation in June 1977 of the City Energy Management Task Force, and the creation two months later of the city Energy Policy Steering Committee, a 15-member advisory body representing the various constituencies with an interest in city energy policy. The Task Force work, which will be discussed presently, was completed in report form January 1978 and adopted by the City Council two months later. The Steering Committee got off to a slower start but tackled a number of important policy and program recommendations contained in the PECP reports. By January 1979, the Steering Committee had developed most of its energy conservation recommendations in draft form. It was anticipated at that time that the recommendations would be presented either to the public or to the City Council — or to both — in a series of hearings in the spring.

At the time of this writing, the Steering Committee recommendations were available only in draft form and were subject to further revision. However, their general direction was clear. In both the residential and commercial sectors, they called for citywide conservation improvements in older buildings. From 1979 through 1984 under the Steering Committee proposals, the city government would use incentives to encourage building owners to meet conservation standards. These incentives would include conservation counseling services, financial assistance, and tax advantages designed to complement existing state and federal programs. However, after 1984, compliance with conservation standards would be mandatory. At point of sale, an owner could not transfer title to a dwelling that failed to meet city standards.

Energy Conservation in Land Use Planning

For most local governments, land use planning offers important opportunities for long-range energy conservation policy. In fact, state land use planning law requires that comprehensive plans contain provision for conserving energy. Goal 13 of the Land Conservation and Development Commission states: "Land and uses developed on the land

shall be managed and controlled so as to maximize the conservation of all forms of energy, based upon sound economic principles."

However, the Committee found that Portland-area governments, for the most part, have made only modest strides in implementing policies designed to achieve LCDC Goal 13.

Multnomah County appears to be ahead of other jurisdictions in this respect. In a handbook it has written for land developers,¹¹ the county planning commission devotes several pages to siting guidelines that will promote energy conservation in new housing developments. These guidelines encourage such measures as south-facing glass, bermed walls, and landscaping with deciduous trees on the south of the dwelling, evergreen trees on the north. Near the end of 1978, the planning commission staff received an Oregon Department of Energy grant of \$10,000 to write a more thorough set of such guidelines. These are expected to be published at the end of May 1979 in the form of an appendix to the developer's handbook.

A county subdivision ordinance requires developers to consider energy conservation siting measures in their requests for planning commission approval. Another ordinance passed in November 1977 makes energy conservation one of the criteria for reviewing the design of commercial buildings and multiple-family residential dwellings of three or more units. Duncan Brown, an associate land use planner for the county, says the planning office is reluctant to push for a similar ordinance to govern single-family and duplex units. He said the planning commission would prefer to see market demand "push conservation design in the right direction" in this portion of the building industry.

However, residential development is not immune from pending county plans to enhance energy conservation through higher density housing patterns. Brown says county planners will soon be proposing zoning to restrict lot sizes in new developments to 5,000 square feet. Cluster siting and multiple-family residences will also be encouraged. Brown concedes that housing densities of this nature, if not well designed, pose a threat to neighborhood stability and enhance the danger of future housing blight.

By contrast to Multnomah County, Washington and Clackamas counties have barely paid lip service to energy conservation through land use planning. Washington County planners have drafted a three-page statement noting, in essence, that the county's comprehensive land use framework plan has "no goals, policies, or strategies" to implement LCDC Goal 13. That statement questions whether the county should take anything other than a passive role in energy conservation land use planning, and whether it should leave such responsibility with tri-county regional government and the utilities. Clackamas County planners are still studying what, if anything, should be done to achieve Goal 13.

The City of Portland has not yet adopted a formal strategy for meeting Goal 13. However, at the time of this writing, the city's Energy Policy Steering Committee had just completed drafting a detailed list of energy conservation policy recommendations for inclusion in the city's comprehensive plan. In order to help reduce people's dependence on automobiles for work commuting and shopping travel, the recommendations call for zoning changes which would increase residential densities near commercial service areas, along transit routes, and near places of employment. Many of the same recommendations are designed to take advantage of the domestic energy savings that result from multiple-unit living. The Steering Committee also calls for a strong marketing program to promote the city as a place of residence and to encourage labor-intensive industry to stay or locate in the city.

When the Portland Planning Commission issued its *Discussion Draft, Comprehensive Plan* in January 1979, the Steering Committee reviewed it for compatibility with its energy conservation concerns. In a letter to the planning commission, the Steering Committee noted some conflicts between its own energy conservation preferences and the draft plan. But overall, it expressed satisfaction "with the compatibility of the Compre-

¹¹*A Developer's Handbook, Part 1, Site Design*

hensive Plan and our emerging energy policies." "Clearly," it added, "energy conservation has been considered in the Bureau of Planning staff work [on the comprehensive plan]."

The City of Portland has also taken a strong stance in support of light rail transit through corridors of high population density, a policy position which is consistent with the planning commission's comprehensive plan draft.

Beaverton appears to be taking a more active land use approach to energy conservation than other small cities in the area. As a part of its comprehensive land use plan, the city has adopted a statement of energy conservation principles, including the encouragement of greater housing densities along high capacity transit corridors. City zoning ordinances which went into effect in September 1978 restrict lot sizes to 7,000 square feet in new development and redevelopment areas. City planners will soon be considering whether to tighten that limitation to 5,000 square feet.

It remains to be seen what energy conservation policies and programs, if any, will emerge from the newly-formed Metropolitan Service District (MSD). Before the Columbia Region Association of Governments (CRAG) was merged into the new MSD, the Committee interviewed Larry McCord, who was then with the CRAG planning staff. McCord reported that the agency had not developed a distinctive role for itself in energy conservation. He noted that CRAG had sponsored two energy conservation studies, a 1976 report, *Critical Energy Issues for the CRAG Region*, and a five-part study a year before entitled *CRAG Regional Energy Analysis*. CRAG also shared the services of an energy policy consultant with its member governments.

Conservation of Energy in Local Government Operations

Motivated by the money they can save and the example they can set, local governments appear to be making progress toward reducing their internal energy consumption. The City of Portland and Multnomah County have been most active in this respect.

Portland's Energy Management Task Force, composed of the city's key facility managers, recommended a package of conservation measures which received City Council approval in March 1978. The measures proposed to incorporate energy conservation improvements in city purchasing procedures, fleet management, vehicle mileage efficiency, personnel travel, building management, street lighting, and capital budgeting. The Council also approved a Task Force recommendation to annually set aside funding to carry out such energy conservation efforts.

Just a few months after the Task Force began its work in June 1977, the city launched an energy efficiency audit of its buildings. In a report of that effort, the audit team found potential for the city to reduce energy costs 20 to 45 percent through both capital and noncapital conservation measures. The initial recommendations in that report, many of them calling for better maintenance procedures in HVAC equipment, are being carried out at this writing.

Multnomah County is assertively pursuing internal energy conservation. According to Carl Moseley, who headed that effort, the county government has set goals and implementation schedules for saving energy in purchasing and in building and fleet operations. This is complemented by an office waste paper recycling program. The county recently completed an energy use audit of its major buildings. The county commission has approved \$1 million worth of capital improvement proposals to eliminate much of the energy waste identified in that audit. Although the projects have been improved, funds for them had not yet been allocated at the time of this writing.

Meanwhile, the county has been attempting to cut its energy consumption level through such intensive management efforts as eliminating excess lighting and keeping a tight rein on thermostat settings. One encouraging result: In July 1978, the county used half the facility energy it did in July 1977.

This success complements the county's overall goal of budgeting only a 12 percent increase for utilities from fiscal 1977 to 1979. According to Moseley, past consumption

levels would require a budget increase of 23 percent (figuring in rate increases). The budget increase limitation, with the conservation effort required to achieve it, is expected to save about \$50,000 per year, based on the 1977 cost of \$500,000 for utilities.

Like Portland, Clackamas County, Beaverton, and Lake Oswego have energy management task forces. These jurisdictions are initiating conservation measures, although on a much smaller scale than Portland and Multnomah County. Beaverton and Lake Oswego also have established programs to evaluate their internal energy use.

Energy Conservation Staffing

Despite the progress local governments have made in their energy conservation policies and programs, it appears that most of them have done so with inadequate staffing. For the most part, they have used CETA¹² federal public service employment funds or other short-term government grant moneys to underwrite the employment of energy staff specialists. As these short-term funds have expired, energy personnel have usually been laid off. The work they began has either been abandoned or has been shuffled off as a collateral duty to permanent personnel. Although the City of Portland staffed most of its initial energy conservation efforts through grant funds, it now is the only local jurisdiction which appears to have an adequate energy policy and program staff supported by its own budget dollars.

As a number of local government officials have pointed out to the Committee, some local jurisdictions would probably have a great deal more to show in the way of energy conservation progress if they considered it important enough to support with their own budget resources.

Intergovernment Cooperation

The Committee found very little substantive cooperation on energy conservation matters among general purpose governments in the metropolitan area. CRAG's then energy consultant, Michael Weinstein, put on several seminars for local government employees. Frank Quinlan of the Oregon Department of Energy formed a local energy program committee. It has held several meetings but is described by one local government official as "going nowhere so far." Other jurisdictions are acting with very little aid or information exchange among one another.

The Schools

There are roughly two dozen urban and suburban public school districts in the metropolitan area. Altogether, they contain more than 300 building complexes, and they daily influence nearly 160,000 children. The Committee found that many schools, as energy consumers, are increasingly practicing energy conservation and sharing information about it as a prudent form of plant management. However, it is through their educational role that the schools have their greatest potential influence on energy conservation; and it is in this respect that many of them are doing very little.

At this writing, only two school districts, Beaverton District 48J and North Clackamas District 12, have carried out a system-wide commitment to a well-defined program of energy and energy conservation education. Portland District 1 has made the policy commitment and is planning to introduce energy education into its schools, but has gotten no further than requiring energy learning objectives in its science curriculum. The district has also established an energy study center at Cleveland High School.

According to a spokesman in the Oregon Department of Education, other metropolitan-area districts have not come to grips with this educational task on a system-wide basis. The small amount of energy education that exists in other area school systems is the result of a handful of teachers and building principals who have made the subject a priority among their professional objectives.

One area office superintendent in the Portland School District put the problem most succinctly. "You're going to find a lack [in our local schools] of any systemized approach

¹²Comprehensive Employment and Training Act

to making the younger generation aware of the cost and benefits of prudent energy use. Our kids are growing up with an energy knowledge that looks like Swiss cheese."

The Committee found that there is ample and generally well-regarded curriculum material available on energy in the K-12 grade plan, most notably through a Portland nonprofit corporation known as Energy and Man's Environment and through the National Science Teachers' Association. The Committee also encountered praise among local educators of Portland State University's School of Education for offering summer institutes in energy education for classroom teachers.

An Oregon Department of Education official said school systems like Beaverton, fourth largest in the state, and North Clackamas, fifth largest, are successful in offering energy education because they have made a policy commitment to it, spent money on it, released teachers for training, and then put it in the classroom. To get more local school systems to pursue energy education, a group of interested local educators and state education officials is trying to form an energy education coalition in the Portland area.

The Committee found that local community colleges are playing a useful role in energy conservation education. Since the summer of 1977, Clackamas, Mt. Hood, and Portland community colleges have all offered the public evening mini courses on subjects which have included insulation, storm windows, water heating, and maintenance of residential energy equipment. All of these offerings have been well promoted; but turn-out has varied from school to school.

Portland Community College has been teaching insulation and other energy conservation subjects for several years as part of its home remodeling course offerings. Also for the past several years, Clackamas Community College has been teaching energy conservation practices in plant management to school and commercial building operators. Most of the participants have been school personnel.

As an institutional consumer, Clackamas Community College has been especially successful in energy conservation. Three years ago the school took steps to reduce energy consumption by 20 percent. In the summer session, it has cut energy use even further by going to a ten-hour, four-day week. It also has installed a more efficient lighting system.

V. CONCLUSIONS

1. As a public philosophy, energy conservation in the Portland area is only five years old. Most policymakers in the public and private sectors recognize its importance, but that recognition is not yet shared by a majority of residential, commercial, and smaller industrial consumers. Consequently, a tremendous amount of energy and money is being wasted. The Portland area has made only a modest beginning toward conserving energy. The most important gains are yet to be achieved.

2. Because the Portland area makes up roughly half of Oregon's population and one-sixth of the region's population, its conservation accomplishments (especially in regard to electricity) can make a perceptible contribution to the welfare of the state and region as well as the metropolitan area.

3. The Committee does not believe that energy conservation, on local, state, and regional levels, can be practiced on a large enough scale to eliminate load growth demand for electricity. Nevertheless, conservation can help minimize the need for new generating facilities.

4. It appears that most residential, commercial, and smaller industrial consumers in the Portland area are not presently inclined to take voluntary conservation actions. Those who are so inclined usually take measures which involve the least cost and inconvenience. However, the energy conservation efforts which produce the best results usually require capital investment, some temporary inconvenience, and technical know-how. The Committee believes there are only two basic influences which will motivate people to surmount these obstacles: 1) market forces, such as rising energy costs, and 2) government policy which either mandates conservation or encourages it through financial incentives. The

Committee believes that media promotions and other information efforts complement these forces but have little substantive impact on their own.

5. Based on its findings, the Committee concludes that higher energy costs have not yet motivated enough consumers to invest in energy conservation. Either energy costs are not yet high enough to make such an investment cost effective, consumers are not aware that certain measures have become cost effective, or consumers don't know enough about cost effectiveness as a principle governing investment decisions. The Committee believes it is appropriate for government to encourage or mandate energy conservation when consumer initiatives or market forces fail to do so.

6. The best energy conservation policies and programs are those which are long range in their intent and scope. Short-term measures (such as curtailments and appeals to people to reduce their energy use) are appropriate during a crisis, but they are purely band-aid actions which fail to deal with the underlying problem of increasing energy scarcity and cost.

7. In the single-family home portion of the residential sector, where conservation policy has been focused, some promising beginnings have been made, not only through strong state codes governing new home construction, but also through state laws and utility programs designed to retrofit the area's poorly weatherized older homes. Laws promoting state-subsidized, low-interest weatherization loans appear to be basically sound. The deferred-repayment, no-interest loan program implemented by Portland's two private electric utilities is even better. However, the Committee sees no reason why benefits in either or both of these programs should not be extended to cover at least duplexes, and perhaps condominiums and multiple-unit rental dwellings.

8. The Committee carefully considered the potential for wider application of the state law which requires adequate weatherization of any home financed through the Oregon Department of Veterans' Affairs. The Committee found that a number of people favor the eventual expansion of such a requirement to all residential transactions, but it concludes that such a policy would represent an unwarranted government intrusion into private affairs. The Committee believes the same energy conservation objectives can be promoted by simply requiring owners to furnish a certified rating of a dwelling's energy efficiency when they offer it for sale or rent. This would encourage conservation by tying the marketability of sale or rental property to its energy efficiency. (As a matter of record, the Committee has no objection to the state GI mortgage loan weatherization requirement. The eligible borrower who dislikes its energy conservation provisions is free to obtain higher-cost financing elsewhere.)

9. In the commercial and industrial sectors, and in the rental portion of the residential sector, there are conservation potentials which consumer initiative, market forces, and local and state policymakers have not yet addressed.

10. In particular, no one has developed an adequate data base on energy use and efficiency in commercial buildings. Further, conservation codes for new commercial building construction are incomplete because they do not contain energy conservation performance standards for exterior walls. Finally, until some government policies are developed, it appears that a majority of commercial building owners and occupants will do very little to assess their energy-use efficiency and to effectively conserve energy.

11. Even less attention has been paid to energy conservation in industry than in commercial building construction and management. Large industrial firms are taking care of their own conservation needs, but there seems to be little leadership either inside industry or in the public sector intended to help small and medium-sized industrial firms make more efficient use of their energy resources.

12. The Committee is impressed with the amount of attention the City of Portland has devoted to energy conservation policy, not only as a city issue but as an issue for the whole metropolitan area. The Portland Energy Conservation Project and the Energy Policy Steering Committee provide an important foundation for the development of energy conservation policies that meet the needs of the Portland area. However, the

Committee is convinced that Portland's efforts in this regard will be less effective so long as the city and other general purpose jurisdictions in the area continue to deal with energy policy in isolation from one another.

13. It appears that local governments are making a sincere effort to assess and better manage their own energy consumption. The City of Portland and Multnomah County have made particularly good progress in this respect. However, except for the City of Portland, most Portland-area governments have not made an adequate commitment of their own budget resources to properly staff their energy conservation efforts. This is true of their efforts in policy making as well as their efforts to manage internal energy use.

14. By and large, local governments have made few strides in promoting energy conservation through land use planning. Multnomah County has accomplished more in this respect than other local jurisdictions. The Portland Energy Policy Steering Committee has drafted a set of excellent energy conservation recommendations for inclusion in the city's comprehensive plan.

15. Although they have a captive audience in the next generation of energy consumers, nearly all of the public schools in the Portland area have not made an adequate, systematic commitment to energy and energy conservation education. Beaverton and North Clackamas public schools have demonstrated by their example that such an effort is feasible.

VI. RECOMMENDATIONS

Although the Portland area has yet to realize most of its energy conservation potential, the Committee believes that local and state leaders have already taken a great number of the policy and program initiatives needed to help achieve that potential. Therefore, the Committee offers a limited number of recommendations. These are intended primarily to complement efforts already under way.

In preface to the recommendations listed below, the Committee attaches this blanket recommendation: While energy conservation should be promoted and even mandated as a means of achieving all feasible energy savings, incentives should not be established unless consumers fail to take conservation actions as a matter of personal conviction or responsiveness to rising energy costs; mandatory measures should not be pursued unless it is apparent that price responsiveness and incentives are not motivating consumers to take effective conservation actions. By the same token, no one should be compelled to invest in any conservation measure which is not economically sound.

1. A certified energy use and efficiency analysis should be a prerequisite condition to the offering for sale or rental of both residential and commercial buildings, and individual units. Utilities and energy suppliers already furnish the energy analysis free of charge. Appraisers or other consultants might be interested in adding this capability to their existing services. Once completed, an energy analysis report would have to be made available for potential buyers or renters to examine prior to the execution of any written agreement. This would make the energy efficiency of every building a consideration in its marketability.

2. The 1979 legislature and the state's major residential energy suppliers should extend weatherization financing incentives to the full spectrum of the residential sector: condominiums, multiple-unit rentals, and — to the extent it is technically feasible — mobile and modular homes. (Note: As this report was being prepared for printing, the 1979 legislature was considering HB 2147, a package of provisions designed to extend weatherization incentives to owners of apartment buildings, houseboats, and mobile homes.)

3. State government should mandate and help fund a comprehensive effort to collect data on energy use and efficiency in commercial buildings. Such a data base will provide a foundation for the development of further conservation policy in this sector.

4. The state should add exterior wall standards to its new energy conservation codes governing construction of new commercial buildings.

5. Local governments in the Portland area should put their money where their rhetoric is on energy conservation by budgeting adequate, full-time staff to develop and implement energy conservation policies and programs. Even if they must use their own funds for this purpose, the savings that result from better internal energy management should more than offset the salaries involved.

6. The City of Portland should adopt for inclusion in its comprehensive plan the land-use energy conservation recommendations developed by the Portland Energy Policy Steering Committee.

7. Local governments in the Portland area should develop a conference format by which their representatives on energy issues can get together, *at least* twice a year, to share information on their energy conservation efforts, progress, and problems.

8. Portland-area school districts which have not made a system-wide commitment to energy and energy conservation education (which means most of them) should do so formally and immediately. In support of that commitment, they should develop basic energy and energy conservation curriculum components which will be ready for classroom use no later than the 1979-80 school year.

9. The 1979 Oregon legislature should consider complementing the federal investment tax credit on industrial energy conservation expenditures with one of its own.

Respectfully submitted,
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Robert M. Greening, Jr.
Paul Oliver
Katherine L. Runnion
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APPENDIX A

PERSONS INTERVIEWED

Bard, Tom, Vice President, The Gilley Company
 Biggs, Joan, Public Affairs Director, KGW TV
 Boggan, Dan, then Director, Office of Management Services, and Chairman,
 Energy Management Task Force, City of Portland
 Brand, George, Executive Director, Oregon Remodelers Association, Inc.
 Brendler, Gene, Public Affairs Director, KPTV
 Brown, Duncan, Associate Planner, Multnomah County Planning Commission
 Cohen, Joyce, representative, Energy Conservation Coalition
 Cooper, Roy, Public Affairs Director, KATU TV
 Conkling, Roger L., Senior Vice President and Economist, Northwest Natural Gas Company
 Davenport, Ted, Vice President, Corporate Planning and Development, Pacific Power and
 Light Company
 Davey, Don, Energy Conservation Officer, Bonneville Power Administration
 Donaca, Thomas C., General Counsel, Associated Oregon Industries
 Eriksen, William, President, Construction Consulting Association, Long Beach, California
 Fletcher, Will, Superintendent, Area I, Portland School District 1
 Foleen, Ray, Deputy Administrator, Bonneville Power Administration
 Friday, Walter M., then Chief Structural Engineer, Building Codes Division, Department of
 Commerce, State of Oregon
 Frost, Larry, Operations and Utility Management Staff, Tektronix, Inc.
 Fullman, Carl, President, Tri-M Inc. and past Chairman, Energy Conservation Board
 Gaskins, Wayne, Forester, Western Forest Industries Association
 Gassner, Len, Executive Director, Oil Heat Institute of Oregon
 Goodell, Stan, Executive Vice President, Portland Association of Building Owners and
 Managers
 Gratton, Margaret, Director of Community Education, Mt. Hood Community College
 Griffith, Bill, Manager, Consumer Loans, Benjamin Franklin Savings & Loan Association
 Grimes, Dan, formerly Energy Curriculum Specialist, Oregon State Department of Education
 Grimm, Donald R., Manager, Energy Conservation Services, Pacific Power and Light Company
 Hamilton, Tom, Area Coordinator, Community Services, Portland Community College
 Harding, Glenn, Director, Technical Services, Oil Heat Institute of Oregon
 Hargadine, Bill, Coordinator, Community Services, Clackamas Community College
 Helman, Rick, former host of "Coming Up for Air" public affairs program, KINK Radio
 Hemmingway, Roy, Deputy Public Utility Commissioner for Utilities, State of Oregon
 Hemphill, Marion, Energy Advisor, Office of Planning and Development, City of Portland
 Hildebrand, Larry, then City Editor, *The Oregonian*
 Hilton, Harry, Northwest Manager, Reynolds Metal Company and member,
 Western Aluminum Producers
 Jacox, Norman C., General Manager, Northwest Public Power Association
 Johnson, Bruce, Chief Engineer, Columbia Steel Casting Company
 Jones, John, President, Energy and Man's Environment
 Kafoury, Stephen, Oregon State Senator, District 7
 Katz, Myron, Planning Officer, Bonneville Power Administration and Director,
 Northwest Energy Policy Project
 Keesee, Bob, Senior Economist, Government Affairs Department, Georgia Pacific Corporation
 and then Chairman, Energy Committee, Portland Chamber of Commerce
 Langworthy, Baird, former Coordinator, Job Skill Improvements,
 Clackamas Community College
 Lee, Karen, Public Affairs Director, KOIN TV
 Leshuk, James P., P.E., Mechanical Engineer, then with UMA Engineers, Inc.
 Lindikoff, Udo, Conservation Insulation Representative, Northwest Natural Gas Company
 Manley, Paul, Reporter, *Oregon Journal*
 McCauley, John, representative, Consumer Power League
 McCord, Larry, then Planner, Columbia Region Association of Governments
 Meeker, Richard, Editor, *Willamette Week*
 Miller, Ed, Vice President of Production, Oregon Portland Cement Company

Morris, Edwin, Chief Engineer, Clark County Public Utility District
Moseley, Carl, then Energy Coordinator, Support Services Division, Multnomah County
Dept. of Administrative Services
McClellan, Charles R., formerly Manager, Energy and Field Conservation,
Portland General Electric Company
McManus, Vern, formerly Resources Coordinator, Office of Emergency Services,
Multnomah County
Olson, Paul, Energy Conservation Specialist, then with Acousti-Therm Insulation
Northwest, Inc.
Pearson, Geraldine, Coordinator, Development Education, Portland Community College
Piper, David, then Manager, Public Power Council
Pollock, Walter, former Supervisor, Conservation Section and Alternate Resources Section,
Department of Energy, State of Oregon
Reid, Gary, Portland area home builder; then member, Energy Conservation Board; member,
Oregon Homebuilders Association
Reinhart, Roy, General Manager, Energy Conservation Office, Bonneville Power Administration
Roeder, Paul, Engineering Supervisor, Clackamas Community College
Rush, Frank, Director, Technical Services, Pacific Power and Light Company
Schnell, Peter, then Director of Public Relations, Publishers Paper Company
Steed, Ray, Superintendent, Area III, Portland School District 1
Stoppiello, Anthony, Architect, then with Zimmer Gunsul Frasca Partnership
Sturtz, Larry, Architect, then with Skidmore, Owings & Merrill
Tait, W. L., Department Manager, Conservation, Portland General Electric Company
Warren, Jack, Energy Management Consultant, Portland General Electric Company
Weinstein, Michael, self-employed energy consultant
Wik, Harold, Specialist in Curriculum Services, Beaverton School District 48J
Wilson, Grant, Director, Support Services Division, Multnomah County
Wyers, Jan, Oregon State Senator, District 6
Zimmerman, Orin, General Manager, Conservation, Portland General Electric Company;
Chairman, Pacific Northwest Utilities Conference Committee

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